Promotion of Community Initiative for Maintenance of Small Scale Infrastructures in Developing Countries

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Abstract. In this paper grass roots approach from civil engineering towards maintenance of infrastructures in developing countries are reported. The "Do-nou" (soilbags) technology was developed as appropriate technology and disseminated in Asia and Africa. The technology successfully promote to the community initiatives for maintenance of small scale infrastructures.

Keywords: Community initiative, maintenance, small scale infrastructure, Do-nou (soilbag)

1. INTRODUCTION

In developing countries, generally, rural infrastructures, such as rural road, slope protection, riverbank and small scale dam or embankment are not well maintained due to financial deficit from the government. Sometime, the terrain like steep slope and crossing valleys, and climate conditions like torrential rain, constrain the improvement of those rural infrastructures.

The poor conditions of rural road limit access of harvested crop to markets and hampers provision of basic services, such as school and hospital. The lack of accessibility of the rural roads has been identified as one of the main causes of poverty to the rural community.

Instead of being given up to provide communities with better infrastructures with the reason of financial constraint, with the motivation to contribute in reducing the poverty in the third world from the civil engineering, the authors have developed unpaved road maintenance method by using "Do-nou", which is Japanese term for soilbag, technology[1].

This maintenance method is characterized by labour intensive and utilization of locally available material. The application of this simple and effective technology built the confidence for self development and created the consciousness of self reliance among the communities. It is leading to the continuous activities for maintenance.

It is true that the infrastructures maintained by using only locally available material and labour intensive cannot be expected to be borne any disasters. However, as long as the communities understand the durability and maintenance method, it would be sustainable because the communities enable to fix them by themselves.

This approach for rural road maintenance has been applied to the maintenance for rural infrastructures, such as riverbank, dam, embankment, terracing for afforestation in several countries in Asia and Africa.

In this paper, two cases in the Philippines and Kenya are reported.

2. APPROACH TO MAINTENANCE OF COMMUNITY INFRASTRUCTURES

"Do-nou" technology enable the wrapped soil by the woven bags by plastic fiber which are normally used for crops, fertilizer and seeds etc. in rural area of developing countries own the high bearing capacity only by manual compaction[2].

Through the technical transfer of "Do-nou" technology to the communities in developing countries, they become able to maintain the small scale community infrastructures by themselves. The demonstrations of "Do-nou" technology promote the community initiatives to maintain or improve them by themselves continuously by applying the learned technology.

In order to disseminate the technology to the communities in the world, several approaches were taken, Technical cooperation projects for rural development, projects for environmental conservation funded by several financial groups, collaborative projects with the local government, local university and communities etc[3].

3. APPLICATIONS OF "DO-NOU" TECHNOLOGY

3.1. Embankment for footpath in the Philippines

In cooperation with Mariano Marcos State University (hereinafter expressed as MMSU) in the Philippines,

Fig. 1 Construction of embankment for footpath

Fig. 3 The conditions after repair

the embankment for footpath was built by using "Do-nou" technology (Fig. 1).

MMSU has implemented some extension delivery approaches/projects with collaboration of local NGOs. Through the linkage of MMSU, the technology will be transferred to the rural area near the university.

After the first demonstration of building embankment for footpath in 2007, the "Do-nou" technology has been applied to the protection of riverbank adding their own innovations. The embankment built with "Do-nou" technology has born the floods of several rainy seasons, but in 2009, when the huge typhoons which frequency to happen might be once in from 20 to 50 years attached, some part of the footpath was deteriorated as shown in Fig. 2. With the initiatives of the MMSU, the footpath was fixed by themselves quickly to prevent the damaged area spreading (Fig. 3).

3.2. Terracing in Kenya

In Kenya, the decreasing of the forest due to the cutting trees is a serious problem. The Kenyan government made a law that the 10 % of farm land would be covered with the trees. The farmers now need to get nursery and afforest their land in order to comply with the law leading to the environmental conservation.

Fig. 2 Damaged part by brunt of the typhoon

Fig. 4 Farmers in Kenya building terracing

The farmers groups were trained on how to develop the terracing as seedbed by using "Do-nou" technology (Fig. 4). The trained farmers were motivated to continue the nursery because the other farmers bought the nursery from them. To build the terracing and do nursery attract the subsistent farmers as one of options for income generation.

4. CONCLUSION

The technology and approach were specifically developed to encourage the communities in developing countries to take actions by themselves to adjust to the climate conditions and improve their livelihood. The grass roots technology and approach from civil engineering can contribute to promote the community initiative to maintain small scale infrastructures.

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